

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (canceled).

1 Claim 2 (currently amended): Apparatus for providing a
2 web-accessible virtual processing environment to a
3 network-connected office server for a remotely connected
4 user computer through which a user stationed at the computer
5 can execute any of a plurality of server-based applications
6 resident at the office server, comprising:

7 a platform, capable of being situated in network
8 communication between the user computer and the office
9 server, having:

10 a processor;

11 a memory connected to the processor and for
12 storing computer executable instructions therein;

13 first and second network interfaces, operable in
14 conjunction with the processor, for interfacing the
15 platform, through the first network interface, to a wide
16 area network (WAN) connection through which the remote user
17 computer obtains connectivity to the platform, and, through
18 the second network interface, to a local area network (LAN)
19 having a server computer electrically communicative
20 thereover, respectively, with the server computer forming
21 the office server; and

22 wherein, in response to the executable
23 instructions, the processor, for each one of the
24 server-based applications:

25 provides, through a corresponding client
26 application module implemented on the platform for each of
27 the server-based applications, bi-directional protocol
28 conversion of messages between the remote user computer and
29 the office server, such that user interaction data, intended
30 for a specific one of the server-based applications and
31 provided by a browser executing on the remote user computer
32 in a first protocol, is converted into a second protocol
33 associated with said one server-based application and then
34 applied to the server-based application at the office
35 server, and output data, provided by said specific one
36 server-based application, is converted from the second
37 protocol to the first protocol for being transmitted to the
38 user computer and graphically rendered thereat, through the
39 browser, to the user; and

40 wherein, in response to the executable
41 instructions, the processor:

42 ~~The apparatus in claim 1 wherein the processor, in response~~
43 ~~to execution of the stored instructions:~~

44 _____for messages emanating from the user computer
45 and appearing on the WAN connection:

46 _____receives, from the browser, a first
47 message containing the user interaction data associated with
48 a specific one server-based application and in the first
49 protocol;

50 _____converts the user interaction data in
51 the first protocol to the second protocol associated with
52 the specific one server-based application to yield a second
53 message; and

54 _____applies the second message, as input, to
55 the server computer for processing by the specific one
56 server-based application; and

57 _____for messages emanating from the server
58 computer and appearing on the LAN:
59 _____receives, from the server computer and
60 over the LAN connection, a third message containing output
61 data generated by the specific one server-based application
62 and in the second protocol;
63 _____converts the output data message in the
64 second protocol to the first protocol to yield a fourth
65 message; and
66 _____applies the fourth message to the WAN
67 connection for transmission to the browser in order to
68 render the output data thereat.

1 Claim 3 (original): The apparatus in claim 2 wherein the
2 server computer comprises a corresponding server for each of
3 the server-based applications and is implemented either
4 coincident with the platform or as at least one physical
5 computer separate from the platform and connected, via the
6 LAN, to it.

1 Claim 4 (previously submitted): Apparatus for providing a
2 web-accessible virtual processing environment to a
3 network-connected office server for a remotely connected
4 user computer through which a user stationed at the computer
5 can execute any of a plurality of server-based applications
6 resident at the office server, comprising:

7 a platform, capable of being situated in network
8 communication between the user computer and the office
9 server, having:

10 a processor;
11 a memory connected to the processor and for
12 storing computer executable instructions therein;

13 first and second network interfaces, operable
14 in conjunction with the processor, for interfacing the
15 platform, through the first network interface, to a
16 wide area network (WAN) connection through which the
17 remote user computer obtains connectivity to the
18 platform, and, through the second network interface, to
19 a local area network (LAN) having a server computer
20 electrically communicative thereover, respectively,
21 with the server computer forming the office server; and
22 wherein, in response to the executable instructions,
23 the processor, for each one of the server-based
24 applications:
25 provides, through a corresponding client
26 application module implemented on the platform for
27 each of the server-based applications,
28 bi-directional protocol conversion of messages
29 between the remote user computer and the office
30 server, such that user interaction data, intended
31 for a specific one of the server-based
32 applications and provided by a browser executing
33 on the remote user computer in a first protocol,
34 is converted into a second protocol associated
35 with said one server-based application and then
36 applied to the server-based application at the
37 office server, and output data, provided by said
38 specific one server-based application, is
39 converted from the second protocol to the first
40 protocol for being transmitted to the user
41 computer and graphically rendered thereat, through
42 the browser, to the user;
43 wherein the processor, in response to execution of the
44 stored instructions:

45 for messages emanating from the user computer and
46 appearing on the WAN connection:

47 receives, from the browser, a first message
48 containing the user interaction data associated
49 with a specific one server-based application and
50 in the first protocol;

51 converts the user interaction data in the
52 first protocol to the second protocol associated
53 with the specific one server-based application to
54 yield a second message; and

55 applies the second message, as input, to the
56 server computer for processing by the specific one
57 server-based application; and

58 for messages emanating from the server computer and
59 appearing on the LAN:

60 receives, from the server computer and over
61 the LAN connection, a third message containing
62 output data generated by the specific one
63 server-based application and in the second
64 protocol;

65 converts the output data message in the
66 second protocol to the first protocol to yield a
67 fourth message; and

68 applies the fourth message to the WAN
69 connection for transmission to the browser in
70 order to render the output data thereat;

71 wherein the server computer comprises a corresponding
72 server for each of the server-based applications and is
73 implemented either coincident with the platform or as at
74 least one physical computer separate from the platform and
75 connected, via the LAN, to it;

76 the apparatus further comprising, in the platform, a
77 separate corresponding software-implemented application
78 module for each of the specific server-based applications
79 for providing protocol translation of the user interaction
80 data and output data between the first and second protocols;
81 the application module comprises:

82 a user interaction component communicative,
83 through the WAN connection, with the browser, for
84 accepting the user interaction data from the browser in
85 the first protocol and for providing said output data
86 to the browser in the first protocol;

87 a state machine, communicative through an
88 application processing interface with the user
89 interaction component, for interpreting each command
90 issued by the user interaction component so as to
91 provide the user interaction data to the specific one
92 server-based application executing on the server
93 computer, and communicative through a client protocol
94 component, for sending user interaction data to the
95 server-based application and for receiving said output
96 information from the specific one server-based
97 application; and

98 a client protocol component, operative in
99 conjunction with the state machine, for converting the
100 user interaction data received from the state machine
101 into the second protocol and applying resultant
102 messages in the second protocol to the specific one
103 server-based application, and for receiving said output
104 data in the second protocol from the specific one
105 server-based application and applying said output data
106 to the state machine.

1 Claim 5 (original): The apparatus in claim 4 wherein the
2 server-based applications comprise thin-client application
3 hosting, e-mail and shared file access; and the first
4 protocol comprises HTTP, secure HTTP, or a protocol with
5 AIP-like functionality and the second protocol comprises RDP
6 (remote desktop protocol), IMAP (Internet mail access
7 protocol) or SMB (server message block).

1 Claim 6 (original): The apparatus in claim 5 wherein the
2 user interaction data comprises a designation of a uniform
3 resource locator (URL), uniform resource identifier (URI),
4 form input, keystrokes or mouse clicks that returns
5 associated information desired by the user, and output data
6 comprises graphical display data.

1 Claim 7 (original): The apparatus in claim 6 wherein said
2 output data comprises bitmap graphic output display data
3 generated by the specific one server-based application.

1 Claim 8 (original): The apparatus in claim 7 wherein the WAN
2 connection comprises either a private network connection or
3 an Internet connection.

1 Claim 9 (original): The apparatus in claim 8 wherein the
2 second network interface comprises an Ethernet interface,
3 and the first network interface comprises a broadband
4 network interface.

1 Claim 10 (original): The apparatus in claim 9 wherein the
2 broadband network interface comprises a digital subscriber
3 line (DSL) interface, a cable modem, an integrated services

4 digital network (ISDN) interface, a T1 interface or a
5 fractional T1 interface.

Claim 11 (canceled).

1 Claim 12 (currently amended): A method for use, in
2 apparatus, which provides for providing a web-accessible
3 virtual processing environment to a network-connected office
4 server for a remotely connected user computer through which
5 a user stationed at the computer can execute any of a
6 plurality of server-based applications resident at the
7 office server, the apparatus comprising a platform, capable
8 of being situated in network communication between the user
9 computer and the office server, having: a processor, a
10 memory connected to the processor and for storing computer
11 executable instructions therein; first and second network
12 interfaces, operable in conjunction with the processor, for
13 interfacing the platform, through the first network
14 interface, to a wide area network (WAN) connection through
15 which the remote user computer obtains connectivity to the
16 platform, and, through the second network interface, to a
17 local area network (LAN) having a server computer
18 electrically communicative thereover, respectively, with the
19 server computer forming the office server; wherein, the
20 method comprises the steps, performed by the processor, for
21 each one of the server-based applications:
22 providing, through a corresponding client application
23 module implemented on the platform for each of the
24 server-based applications, bi-directional protocol
25 conversion of messages between the remote user computer and
26 the office server, wherein the providing step comprises the
27 steps of:

28 converting user interaction data, intended for a
29 specific one of the server-based applications and provided
30 by a browser executing on the remote user computer from a
31 first protocol into a second protocol associated with said
32 one server-based application so as to yield converted user
33 interaction data;

34 applying the converted user interaction data to
35 the server-based application at the office server;

36 converting output data, provided by said specific
37 one server-based application, from the second protocol to
38 the first protocol so as to yield converted output data; and

39 transmitting the converted output data to the user
40 computer to be graphically rendered thereat, through the
41 browser, to the user; and

42 ~~The method in claim 11 further comprising the steps of:~~

43 for messages emanating from the user computer and
44 appearing on the WAN connection:

45 receiving, from the browser, a first message
46 containing the user interaction data associated with a
47 specific one server-based application and in the first
48 protocol;

49 converting the user interaction data in the first
50 protocol to the second protocol associated with the specific
51 one server-based application to yield a second message; and

52 applying the second message, as input, to the
53 server computer for processing by the specific one
54 server-based application; and

55 for messages emanating from the server computer and
56 appearing on the LAN:

57 receiving, from the server computer and over the
58 LAN connection, a third message containing output data

59 generated by the specific one server-based application and
60 in the second protocol;

61 converting the output data message in the second
62 protocol to the first protocol to yield a fourth message;
63 and

64 applying the fourth message to the WAN connection
65 for transmission to the browser in order to render the
66 output data thereat.

1 Claim 13 (previously presented): The method in claim 12
2 further comprising the step of implementing a corresponding
3 server for each of the server-based applications either
4 coincident with the platform or as at least one physical
5 computer separate from the platform and connected, via the
6 LAN, to it.

1 Claim 14 (previously presented): A method for use, in
2 apparatus, which provides for providing a web-accessible
3 virtual processing environment to a network-connected office
4 server for a remotely connected user computer through which
5 a user stationed at the computer can execute any of a
6 plurality of server-based applications resident at the
7 office server, the apparatus comprising a platform, capable
8 of being situated in network communication between the user
9 computer and the office server, having: a processor, a
10 memory connected to the processor and for storing computer
11 executable instructions therein; first and second network
12 interfaces, operable in conjunction with the processor, for
13 interfacing the platform, through the first network
14 interface, to a wide area network (WAN) connection through
15 which the remote user computer obtains connectivity to the
16 platform, and, through the second network interface, to a

17 local area network (LAN) having a server computer
18 electrically communicative thereover, respectively, with the
19 server computer forming the office server; wherein, the
20 method comprises the steps, performed by the processor, for
21 each one of the server-based applications:

22 providing, through a corresponding client
23 application module implemented on the platform for each
24 of the server-based applications, bi-directional
25 protocol conversion of messages between the remote user
26 computer and the office server, wherein the providing
27 step comprises the steps of:

28 converting user interaction data, intended for a
29 specific one of the server-based applications and
30 provided by a browser executing on the remote user
31 computer from a first protocol into a second protocol
32 associated with said one server-based application so as
33 to yield converted user interaction data;

34 applying the converted user interaction data to
35 the server-based application at the office server;

36 converting output data, provided by said specific
37 one server-based application, from the second protocol
38 to the first protocol so as to yield converted output
39 data; and

40 transmitting the converted output data to the user
41 computer to be graphically rendered thereat, through
42 the browser, to the user; and

43 for messages emanating from the user computer and
44 appearing on the WAN connection:

45 receiving, from the browser, a first message
46 containing the user interaction data associated with a
47 specific one server-based application and in the first
48 protocol;

49 converting the user interaction data in the first
50 protocol to the second protocol associated with the
51 specific one server-based application to yield a second
52 message; and

53 applying the second message, as input, to the
54 server computer for processing by the specific one
55 server-based application; and
56 for messages emanating from the server computer and
57 appearing on the LAN:

58 receiving, from the server computer and over the
59 LAN connection, a third message containing output data
60 generated by the specific one server-based application
61 and in the second protocol;

62 converting the output data message in the second
63 protocol to the first protocol to yield a fourth
64 message; and

65 applying the fourth message to the WAN connection
66 for transmission to the browser in order to render the
67 output data thereat;

68 implementing a corresponding server for each of the
69 server-based applications either coincident with the
70 platform or as at least one physical computer separate from
71 the platform and connected, via the LAN, to it; and

72 providing protocol translation of the user interaction
73 data and output data between the first and second protocols
74 through a separate software-implemented application module
75 for each of the specific server-based applications; wherein
76 the application module comprises:

77 a user interaction component communicative,
78 through the WAN connection, with the browser, for
79 accepting the user interaction data from the browser in

80 the first protocol and for providing said output data
81 to the browser in the first protocol;

82 a state machine, communicative through an
83 application processing interface with the user
84 interaction component, for interpreting each command
85 issued by the user interaction component so as to
86 provide the user interaction data to the specific one
87 server-based application executing on the server
88 computer, and communicative through a client protocol
89 component, for sending user interaction data to the
90 server-based application and for receiving said output
91 information from the specific one server-based
92 application; and

93 a client protocol component, operative in
94 conjunction with the state machine, for converting the
95 user interaction data received from the state machine
96 into the second protocol and applying resultant
97 messages in the second protocol to the specific one
98 server-based application, and for receiving said output
99 data in the second protocol from the specific one
100 server-based application and applying said output data
101 to the state machine.

1 Claim 15 (original): The method in claim 14 wherein the
2 server-based applications comprise thin-client application
3 hosting, e-mail and shared file access; and the first
4 protocol comprises HTTP, secure HTTP, or a protocol with
5 AIP-like functionality and the second protocol comprises RDP
6 (remote desktop protocol), IMAP (Internet mail access
7 protocol) or SMB (server message block).

1 Claim 16 (original): The method in claim 15 wherein the user
2 interaction data comprises a designation of a uniform
3 resource locator (URL), uniform resource identifier (URI),
4 form input data, user keystrokes or user mouse clicks that
5 returns associated information desired by the user, and the
6 output data comprises graphical display data.

1 Claim 17 (original): The method in claim 16 wherein said
2 output data comprises bitmap graphic output display data
3 generated by the specific one server-based application.

1 Claim 18 (original): The method in claim 17 wherein the WAN
2 connection comprises either a private network connection or
3 an Internet connection.

1 Claim 19 (original): The method in claim 18 wherein the
2 second network interface comprises an Ethernet interface,
3 and the first network interface comprises a broadband
4 network interface.

1 Claim 20 (original): The method in claim 19 wherein the
2 broadband network interface comprises a digital subscriber
3 line (DSL) interface, a cable modem, an integrated services
4 digital network (ISDN) interface, a T1 interface or a
5 fractional T1 interface.